

1. Write an equation of an exponential function that passes through the points (0, 3) and (2, 48). Using a table and graph may be useful.

$$y = a \cdot b^x$$

$$48 = 3 \cdot b^2$$

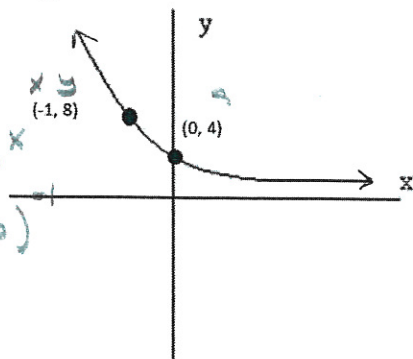
$$16 = b^2$$

$$4 = b$$

$$y = 3(4)^x$$

2. Write the equation for each graph shown.

a.  $y = 4\left(\frac{1}{2}\right)^x$



$$y = a \cdot b^x$$

$$8 = 4(b)$$

$$2 = b$$

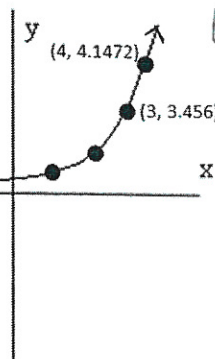
$$\frac{1}{2} = b$$

b.  $y = 2(1.2)^x$

$$y = a \cdot b^x$$

$$y = 2(1.2)^x$$

x	y
0	2
1	2.4
2	2.88
3	3.456
4	4.1472



$$b = \frac{4.1472}{3.456}$$

$$b = 1.2$$

3. The number of people that smoke cigarettes in Amador County has been decreasing at a rate of 5% per year. As of September 1994, the number of people who smoke in the county was 4000. Answer the following questions assuming this rate of decrease will continue.

$$1 - .05 = .95$$

- a. Write an equation that will represent the number of smokers in Amador County in the  $n^{\text{th}}$  year after 1994.

$$n = \text{years after 1994}$$

$$t(n) = 4000(.95)^n$$

- b. According to your model, how many smokers will there be in Amador County in September of the year 2010?

$$n = 16 \text{ years}$$

$$t(16) = 4000(.95)^{16} \approx 1760.52 \text{ smokers}$$

4. Each table below represents an exponential function of the form  $y = ab^x$ . Complete each table, and then write the equation.

a.

x	y
0	2
1	10
2	50
3	250
4	1250

$$y = 2(5)^x$$

b.

x	y
0	80
1	40
2	20
3	10
4	5

$$y = 80\left(\frac{1}{2}\right)^x$$

5. Molly and Tess like to shop at the mall. Their sister Jessica prefers to play bocce ball instead. Molly has \$280 in her bank account and spends \$40 every trip. Tess has \$170 in her account and spends half as much as Molly during each trip. Jessica has \$50 in her account and does not spend any of it.

- a. Find the number of trips it will take for the Molly and Tess to have the same amount of money in their accounts. Show all of your work and explain your method for finding the number of trips.

$$M = 280 - 40x$$

$$T = 170 - 20x$$

$$J = 50$$

$$280 - 40x = 170 - 20x$$

$$110 = 20x$$

$$5.5 = x$$

after 6

- b. When will Jessica have the largest bank account? \_\_\_\_\_ How do you know?

6th trip  
Tess has \$50

twice per year

6. An account is earning 8% interest, compounded semi-annually. The interest is deposited on the first day of each semi-annual period. An initial investment of \$2000 is put into the account and no withdrawals are made for 5 years.

a. Identify the initial value 2000, the multiplier 1.08, and the number of times the interest is compounded over the 5 year time period 10 times.

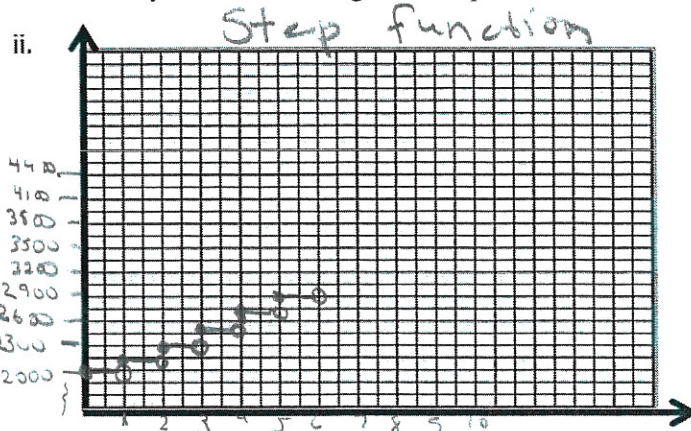
b. Write an equation  $T(n)$  to represent the amount of money in the account, where  $n$  is any number of semi-annual periods.  $T(n) = 2000(1.08)^n$

c. Find the value of the account in 5 years.  $t(10) = 2000(1.08)^{10} = \$4,317.85$

d. Make a table and complete graph representing the amount of money in the bank during that time period.

i.

$n$	$t(n)$
0	2000
1	2160
2	2332.8
3	2519.4
4	2721
5	2938.7
6	3173.7
7	3427.6
8	3701.9
9	3998
10	4317.8



e. What about the table and graph shows that this is compound interest? Explain in sentence form.

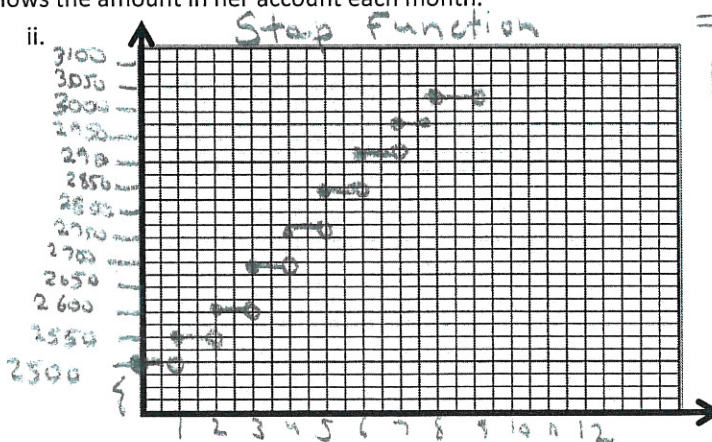
Growing by 8% of the previous amount in the account

7. Mary has 2,500 to deposit into a bank. She puts the money into an account that earns simple interest of 2.75% on the 1<sup>st</sup> of each month, and leaves it for one year.

a. Create a table and complete graph that shows the amount in her account each month.

i.

$x$	$y$
0	2500
1	2568.80
2	2637.50
3	2706.30
4	2775.00
...	...
12	3,325.00



$1 + 0.0275 = 1.0275$

\$68.75 interest per month

b. What about the table and graph shows that this is simple interest? Explain in sentence form.

Growth is constant each month, additional \$68.75 is added each month.

8. Solve the equation  $-2 - 3|5 - x| = -29$

$$\begin{array}{r} -2 \quad \quad \quad +2 \\ -2 - 3|5 - x| = -29 \\ \hline -3|5 - x| = -27 \end{array}$$

$$|5 - x| = 9$$

$$5 - x = 9$$

$$x = -4$$

$$5 - x = -9$$

$$x = 14$$

9. Simplify. No decimals or negative exponents.

$$\left( \frac{(-3x^2y^{-3}z)^2(4x^{-2}y^2z)}{6x^{-4}yz^{-3}} \right)^{-2} = \frac{y^{10}}{36x^{12}z^{12}}$$



$$\textcircled{9} \left( \frac{(9x^4y^{-6}z^2)(4x^{-2}y^2z)}{6x^{-4}yz^{-3}} \right)^{-2}$$

$$= \left( \frac{36x^2y^{-4}z^3}{6x^{-4}yz^{-3}} \right)^{-2}$$

$$= \left( \frac{6x^6z^6}{y^5} \right)^{-2}$$

$$= \left( \frac{y^5}{6x^6z^6} \right)^2 = \boxed{\frac{y^{10}}{36x^{12}z^{12}}}$$